minimum brightness was reached, or until it was certainly beyond the reach of that instrument. In the scale of magnitudes employed here, that limit would have been reached in about a week from the date of the last observation. As the observations show that no change occurred in the rate of decrease while the star passed from the eighth to the sixteenth magnitude, and as it is probable that this movement would not be suddenly arrested, it is fair to presume that the new star became much fainter than the seventeenth magnitude, and passed far beyond the reach of any telescope.

It is also to be regretted that it was not examined earlier when it was again observable in the east. At this time, in the latter part of August, it seems to have reached about $10\frac{1}{2}$ magnitude. This was followed by the important discovery by Professor E. E. Barnard, on the night of August 20, that it was no longer a star, but was a small bright nebula with a nucleus of about the tenth magnitude. The nebulous character of the object was seen at once by this experienced observer, with the ordinary micrometer eyepieces of the large equatoreal. The spectroscopic observations at Mount Hamilton and elsewhere have since shown a corresponding change in the spectrum.

I have been able to examine this star once since its reappearance. On the morning of September 6 it was observed by Professor George E. Hale and myself with the 12-inch of the Kenwood Observatory. At this time it was a little brighter than F, the comparison giving for the magnitude of the new star 10·2.

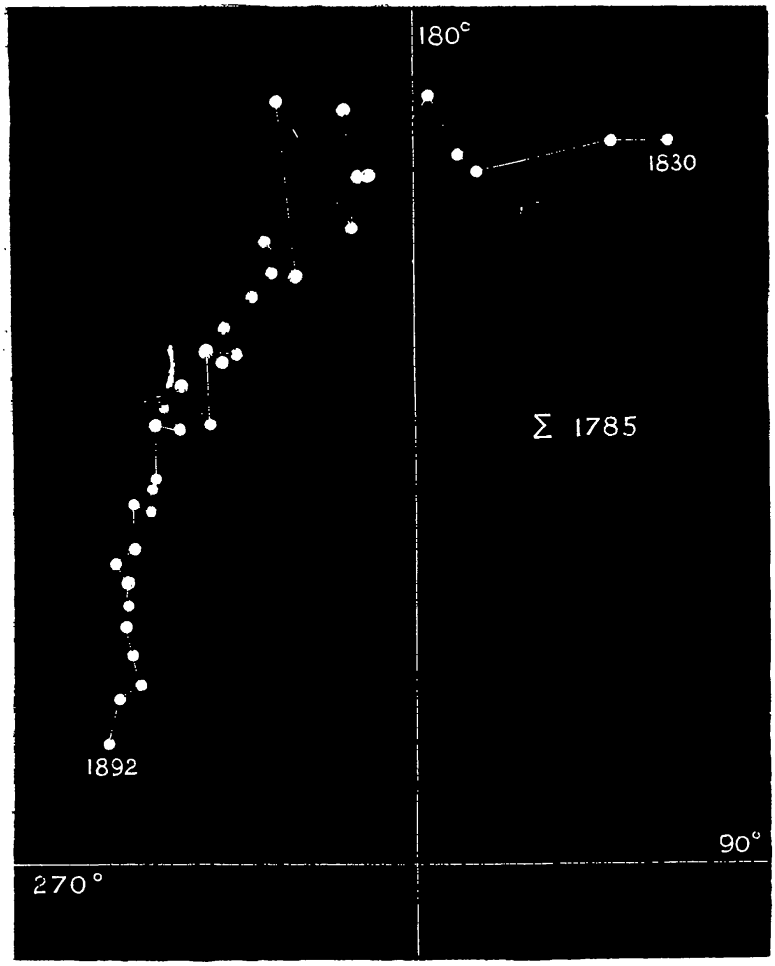
Chicago:
October 17.

The Binary Star Σ 1785. By S. W. Burnham, M.A.

This binary has now passed over 84° of position-angle since the measures of Struve in 1830; and the data are now sufficient for an approximate determination of the elements of the orbit. During this time the distance has been steadily diminishing. It was discovered by South, who measured it in 1823 on a single night. His distance is nearly 2″ too large, as will appear from a comparison with the later measures of Struve and others. It is evident that the period is a very long one, and that the angular change for some time to come will be comparatively rapid. It is therefore desirable that this pair should be measured every year or two for the present.

To facilitate the computation of the orbit, I have made a careful collection, from the original sources, of all the measures, and give them below in chronological order. The last observa-

tions cited were made recently with the 36-inch refractor of the Lick Observatory.



Measures of Σ 1785.

1823·40	160°·4	5″·66	South	·1n
1830·12	164·4	3·49	Struve	3n
1830·20	164·5	4·62	Herschel	1n
1831 ±	163·8	3 ±	Herschel	1n
1831·34	166·3	(7·69)	Herschel	2n
1843·48	174·6	3·39	Mädler	3n
1846·40	176·2	3·19	Philpott	4n
1850·44	178·0	...	Mädler	1n
1851·28	178·7	3·48	Mädler	2n
1855·32	183·6	3·11	Mädler	2n

1856·31	183°·1	2″·97	Mädler	1n
1856·36	186·0	3·24	Secchi	2n
1858·38	185·1	3·12	Dembowski	5n
1859·32	185·4	2·89	Morton	2n
1861·57	190·0	3·51	Mädler	2n
1863·31	192·0	2·73	Radcliffe	2n
1863·68	191·1	2·66	Dembowski	11n
1864·47	193·5	2·88	Engelmann	2n
1865·42	193·8	2·87	Engelmann	7n
1865·82	193·3	2·59	Dembowski	11n
1867·40	196·1	2·81	O. Struve	2n
1867·83	195·8	2·52	Dembowski	8n
1870·19	198·6	2·54	Dunér	5n
1870·33	199·4	2·79	O. Struve	2n
1870·35	200·5	2·54	Gledhill	4n
1870·81	199·4	2·43	Dembowski	8n
1871·35	199·1	2·43	Radcliffe	2n
1871·38	199·2	2·51	Knott	3n
1871·43	199·9	2·38	Pierce	2n
1872·43	201·7	2·67	Dunér	2n
1872·89	201·9	2·32	Dembowski	8n
1873·42	200·2	2·41	Lindstedt	2n
1873·57	202·2	2·45	Wilson and Seabroke	4n
1874·79	205·2	2·18	Dembowski	7n
1875·24	206·4	2·47	Dunér	3n
1875·32	205·3	2·34	Schiaparelli	5n
1876·00	207·6	2·37	Wilson and Seabroke	4n
1876·41	208·6	2·56	Plummer	2n
1876·45	206·9	2·15	Schiaparelli	4n
1876·85	208·5	2·14	Dembowski	8n
1877·32	208·4	2·21	Doberck	6n
1877·38	208·6	2·25	Schiaparelli	6n
1878·34	210·5	2·14	Dembowski	3n
1878·39	210·7	2·55	Seabroke	2n
1879·42	214·5	2·04	Hall	3n
1879·46	212·5	2·20	Schiaparelli	5n
1879·50	214·0	2·07	Seabroke	3n
1880·35	215·9	1·92	Hall	2n
1880·37	213·8	2·13	Bigourdan	1n
1880·46	215·4	2·27	Jedrzejewicz	3n

1880·46	215·2°	2·03″	Seabroke	3*n*
1881·33	216·9	1·98	Bigourdan	1*n*
1881·36	217·9	2·11	Schiaparelli	4*n*
1881·40	215·7	1·96	Hough	1*n*
1881·40	217·8	1·92	Hall	2*n*
1882·42	219·9	1·93	Hall	3*n*
1882·44	220·0	2·13	Schiaparelli	7*n*
1882·45	221·3	2·22	Seabroke	3*n*
1882·46	221·9	2·22	Rugby	3*n*
1882·93	221·2	2·06	Engelmann	7*n*
1883·42	221·6	1·90	Hall	2*n*
1883·46	221·8	1·91	Schiaparelli	6*n*
1884·39	224·8	1·86	Hall	3*n*
1884·46	224·9	1·98	Schiaparelli	4*n*
1884·63	226·6	1·78	Rugby	2*n*
1885·35	223·8	1·86	Perrotin	3*n*
1885·36	226·8	1·78	Hall	3*n*
1885·43	227·9	1·72	Rugby	2*n*
1885·44	227·1	1·83	Schiaparelli	10*n*
1886·38	228·7	1·68	Perrotin	2*n*
1886·41	231·4	1·46	Rugby	2*n*
1886·41	228·0	1·83	Hall	3*n*
1887·37	232·7	1·62	Hall	3*n*
1887·45	231·8	1·67	Schiaparelli	11*n*
1887·45	232·8	1·08	Rugby	1*n*
1887·59	228·0	1·80	Tarrant	2*n*
1888·33	236·5	1·12	Rugby	3*n*
1888·37	233·9	1·61	Hall	3*n*
1889·28	235·3	1·60	Rugby	3*n*
1889·45	237·1	1·51	Hall	3*n*
1890·43	240·7	1·54	Hall	3*n*
1890·47	240·5	1·57	Hayn	1*n*
1892·37	248·6	1·46	Burnham	3*n*

The character of the relative motion will be best seen from the accompanying diagram showing the observed positions for each year in which measures were made. The observations of South in 1823, and those of Herschel in 1830–31, are omitted, as they are obviously erroneous in distance. The diagram strikingly illustrates, even with these omissions, the superior accuracy and consistency of the later measures, although the

components were much closer, and more difficult to observe. Where the years are represented by the measures of more than one observer, the mean is taken for the position shown on the diagram.

The interest of this pair is further increased by the proper motion of the system. This is given by Stumpe from Argelander as 0″·481 in the direction of 262°·95.

The place of this star (1880) is:

R.A. $13^h\ 43^m\ 38^s$
Decl. + 27° 35′

Chicago: November 20.

The Lunar Eclipse, 1892 *May* 11–12. By G. J. Newbegin.

The night of May 11–12 turned out so exceptionally fine and clear that (though in —16° of declination) the Moon soon became a steady object in the telescope.

With regard to the eclipse, I decided to take a series of photos at about half-hour intervals, and so endeavour to secure a permanent record of its several stages.

The exposures were made at 9 20, 9.50, 10 30, 11, 11.30 P.M., 12 midnight, and 12.30 A.M.

The periods of exposure were varied to allow for the decreasing illumination of the Moon, and were respectively 20^s, 20^s, 30^s, 40^s, 30^s, 20^s, 20^s.

The plates were the Ilford Ordinary, developed by hydroquinone.

The instrument by which they were taken is a 9-inch Cooke Equatoreal, aperture reduced to two inches for the whole series.

The intervals between the exposures were occupied in developing the plates.

1892 *November* 11.

Note on an Occultation of DM. + 4°.123 (*Mag.* 6·5) *by Mars on* 1893 *January* 14. By A. M. W. Downing, M.A.

Amongst the cases of possible occultations of stars by planets, given by Herr Berberich in *Ast. Nach.*, No. 3131, is one of the occultation of a 6·5 mag. star by *Mars* on January 14 next. The star will be occulted to observers situated at the Cape and at Durban; and the particulars of the occultation are given below for these observatories, as well as those of the near approach of the planet to the star as seen from Greenwich.